ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

REVIEW ARTICLE

MANAGEMENT OF SUBMANDIBULAR GLAND SIALOLITHIASIS.

Richik Tripathi
BDS, MDS (Oral & maxillofacial Surgery) PhD Scholar, faculty of dental sciences, IMS, BHU ARANASI

Manuscript Info

Manuscript History:

Received: 15 July 2015
Final Accepted: 20 August 2015
Published Online: 30 September 2015

Key words:

Fish fauna, river Gomti, status, biodiversity, conservation

Corresponding Author

Richik Tripathi

Abstract

Sialolithiasis is a common disorder affecting an estimated 12 in 1000 people each year and it accounts for more than fifty percent of the salivary gland diseases. With advancement in field of interventional radiology and surgery, diagnosis and management of submandibular gland sialolithiasis has become more efficient than in past. Concepts of management and details of new techniques for diagnosis and management of sialolithiasis of sabmandibular gland is discussed in this article.

INTRODUCTION

Salivary calculi are usually unilateral in occurrence and round to oblong, have an irregular (majority) or smooth surface, vary in size from a small grain to the size of a peach pit, and are usually yellow in color. The stones may occur in the duct or gland, with multiple stones not uncommon. They are found more often in adults, although they also occur in children. The classic symptoms are that of obstruction manifested by pain and swelling of the involved gland during eating. Since obstruction is rarely complete, the gland swelling will subside to some degree during rest periods. In as much as chronic gland obstruction will
invariably result in inflammation and fibrosis, some swelling and induration may persist even after stone removal. Stones apparently develop as a result of an initial organic nidus followed by the deposition of inorganic material, both of which are derived from the salivary fluid. The filamentous stroma or nidus is not bacterial in nature but rather precipitated mucoids and possibly salivary proteins. The concentration of calcium in saliva is not high enough to precipitate spontaneously, but as Mandel stated, "The matrix provides the architectural template or geometric configuration of the initial apatite crystal[1]." It is therefore clear that salivary stasis and salivary viscosity, rather than the calcium content of the individual salivary gland secretion, play the significant role in its development. Submandibular sialoliths are more common than those of the parotid for a number of reasons. Anatomically, the submandibular duct is longer than the parotid, traversing upward and forward from the gland to the oral floor, whereas Stensen's duct moves in a horizontal direction. In addition, there is diminution in the calibre of Wharton's duct with a corresponding decrease in wall thickness compared with the parotid. One might also expect that the overlying muscles of facial expression would aid, to some extent, parotid salivary flow. Salivary stasis is also facilitated by the fact that the orifice of Wharton's duct is much narrower than that of Stensen's duct . There is one other region in the submandibular duct that is conducive to salivary stasis, and the "comma area," where the duct takes a radical turn inferiorly behind the posterior border of the mylohyoid muscle as it approaches the hilus of the gland.[2] Regarding salivary viscosity, submandibular saliva is more than twice that of the parotid because of its mucus content.

Radiographic examination

The occlusal radiograph is the most reliable method of viewing the submandibular sialolith, but the surgeon should be aware that with the standard view , the region visualized is limited posteriorly to the second molar. The posterior fourth of the duct, which includes the comma area to the hilus and body of the gland, can be visualized only by placing the x-ray cone posterior to the gland and directing it in an upward, anterior, and slightly medial direction[3]. The two views are mandatory because the conventional view may miss a stone in the posterior region and at times multiple stones may be portrayed as single stones, one on each radiographic view . Lateral plate radiographs are effective only with stones in the submandibular gland that project below the inferior border of the mandible . The problem with small to medium-sized stones is that if they are poorly calcified, they will be masked by the bone's density, and if they are well calcified, they may be mistaken for bone whorls or exostoses[4]. Small anterior stones may be hidden by the superimposition of lingual surface of the mandible, and an alteration of the angle of the x-ray cone may be necessary. Poorly calcified stones may be masked by the tongue musculature. If palpation of the area is unsatisfactory, a sialogram may be necessary. On occasion, a calcified submandibular lymph node may be confused with a sialolith; the sialogram will clearly differentiate the two . Furthermore, because the lymph nodes are anterior to the submandibular salivary gland, one should be suspicious when a calcification is projected significantly anterior when using the posterior/anterior view occlusal radiograph. The presence of a soft swelling with or without a purplish discoloration should suggest the possibility of a vascular malformation. Again, the sialogram will provide a positive answer.

Submandibular duct sialolithotomy

The majority of stones develop and enlarge in size but remain fixed in their original position. This occurs because of the irregularly shaped surface, combined with the inflammation and fibrosis of the duct wall surrounding it. These sialoliths are smooth surfaced and have the appearance of a kernel of corn. With stones in a relatively anterior location, the placement of a duct-ligating suture posterior to it can be helpful . In the vast majority of cases, there is one cardinal rule to be followed when considering the removal of stones from Wharton's duct. Because the calculus is intraductal, it can never be lost if the duct is first located and sufficiently isolated before any attempt at its removal is made. The direct cut-down on stones, regardless of their size, in the longitudinal portion of the duct is ill advised for several reasons. The duct may be macerated to such a degree that repair or dochoplasty would be impossible[5], resulting in possible postoperative salivary leakage or stenosis. There also is the possibility that portions of the calcified material may separate from the stone or that the stone itself, if it is small, could be lost into the surrounding tissues, resulting in a foreign body reaction or infection. There are two situations where cut-down procedures are not only acceptable but also recommended. When a sialolith is present at the ductal orifice, an incision over the stone will lead to its extirpation and at the same time will allow for a sialodochoplasty. This is accomplished by suturing the exposed duct walls to their respective adjacent mucosa after the insertion of a lacrimal probe into the duct lumen. Second, when there is a large stone in the submandibular gland , pushing the gland upward and anteriorly will result in the projection of the stone prominence intraorally. Incision through the overlying mucosa will result in the exit of the stone.

Management of acute inflammation secondary to sialoliths

Acute inflammation with suppuration is not a common occurrence as a consequence of obstructive sialadenitis secondary to sialoliths. When it does occur, the degree of suppuration and obstruction will determine the severity of symptoms. Unlike the standard symptoms of obstruction with gland enlargement and discomfort associated with eating, when there is acute inflammation, the swelling persists with more severe pain but without any relation to eating. The local acute inflammation may, at times, result in the spontaneous exfoliation of the stone[6] . When obstruction is more complete, there will be no pus observed and discomfort and gland swelling will be greater. Here, too, the standard technique of sialolithotomy can be used to expose and incise the duct . Following stone removal, there will be a free flow of pus . A standard sialodochoplasty can then be performed after thorough irrigation of the area with sterile saline.

Surgical treatment must be directed toward locating and isolating the submandibular duct. With the edematous floor of the mouth, the caruncular and plica sublingualis are no longer clearcut structures, requiring the operator to estimate their location and direction before commencing the anterior placed mucosal incision. Because there is no possibility of inserting a lacrimal probe into the duct as an aid, careful blunt dissection must be performed to locate the superficially positioned duct. Once accomplished, the standard technique is used to reach and evacuate the stone and obstructed suppuration. The submandibular gland is gently massaged to aid in the elimination of any residual pus and then the operative site is thoroughly irrigated with sterile saline. Unfortunately, the extensive edema does not favour the fabrication of a new duct opening[7]. The wound is loosely closed with interrupted sutures, and a

minimum of 2 or 3 drains are lightly placed. By the third postoperative day, all of the drains are removed. Antibiotics are prescribed in all 3 situations described, with the dosage and length of time of therapy directly related to the severity of symptoms. With careful surgical technique, clinical improvement is rapid.

Lithotripsy as an alternative method of submandibular stone management

Shock wave lithotripsy, using a piezoelectric lithotripter, has been proposed primarily for the treatment of submandibular salivary gland stones. Iro et al[8] treated 35 such stones using ultrasound to identify and localize the sialolith to be fragmented. As a result of this treatment, all stones were fragmented but only 40% showed complete stone clearance, whereas 85% were symptom free after 20 weeks. With only 9-month follow-up, no conclusion could be reached regarding the incidence of symptomatic reobstruction
(recurrence) with these cases. With the need for such advanced armamentarium and the poor results of this treatment, lithotripsy does not appear to be a viable routine method of management for submandibular sialoliths.

Laser sialolithectomy

Sialolithectomy using the Sharplan CO2 laser yields excellent results, with almost no bleeding, minimal scarring, and little discomfort through the healing period[9]. In addition, it permits surgery in the outpatient clinic under local anesthesia even during the acute stage.
Except for the questionable advantage of possibly being fast, there seems to be no other benefit over the standard recommended surgical treatment. However, there are questions relating to such a blind procedure because it is only after the beam encounters the sialolith that "it sparkles" and indicates its exact location. How much tissue destruction is there before "it sparkles," especially with stones in the vicinity of the lingual nerve? Furthermore, in view of the 15 of 27 patients with abnormal salivary flow, what is the status status of the ductal openings after this surgery and what is the susceptibility for recurrence? Certainly, sialodochoplasty to ensure unimpeded salivary flow is not possible with CO2 laser surgery[10]. With the absence of clear benefit and with the possibility of deleterious effects, is this technique, which requires specialized equipment.

Indication for submandibular gland removal

Long-standing submandibular obstructive sialadenitis, whether due to sialoliths or stenosis, naturally leads to chronic gland inflammation with some parenchymal destruction. However, after the elimination of the obstruction, the apparent resiliency of the sub-mandibular gland usually results in no adverse symptoms. Gland extirpation as a substitute for sialolithotomy with stones in the proximal portion of the duct is to be condemned because it does not solve the immediate problem and because symptoms of swelling, discomfort, and suppuration can be expected . Gland removal is indicated only when small stones are present in the vertical portion of the duct from the comma area to the hilus or within the gland itself that are not surgically accessible intraorally and produce obstructive symptoms. Nahlieli and Baruchin, in describing their technique of sialoendoscopy, reported successful results in the removal of stones in this region. When available for use, gland extirpation may not be necessary. Another significant benefit of their technique is its ability to view the duct lumen postoperatively to detect and remove residual stones and to treat potential areas of stenosis. With greater availability of sialoendoscopic armamentarium and more trained operatives of the techniqueone should expect more accurate diagnoses of small or poorly calcified sialoliths, mucus plugs, ductal stenosis, and polyps without the need for the often difficult sialogram. And as a consequence, the management of submandibular gland obstructive disease will become even more effective. Obstructive disease not associated with intraductal plugs, stenosis, or sialoliths may be due to neoplasia, which should always be considered in the differential diagnosis of salivary gland disease.

Reference

1. Characterization of lymphoid infiltrates in chronic obstructive sialadenitis associated with sialolithiasis. Teymoortash A, Tiemann M, Schrader C, Werner JA.
J Oral Pathol Med. 2004 May;33(5):300-4.

2. Sialolith crystals localized intraglandularly and in the Wharton's duct of the human submandibulargland: an X-ray diffraction analysis. Teymoortash A, Buck P, Jepsen H, Werner JA. Arch Oral Biol. 2003 Mar;48(3):233-6.

3. Sonography and plain roentgen image in diagnosis of salivary calculi experimental studies. Födra C, Kaarmann H, Iro H. HNO. 1992 Jul;40(7):259-65

4. The fine surface structure and composition of salivary calculi.
Hiraide F, Nomura Y. Laryngoscope. 1980 Jan;90(1):152-8.

5. Transoral removal of submandibular hilar stone and sialodochoplasty.
Roh JL, Park CI. Otolaryngol Head Neck Surg. 2008 Aug;139(2):235-9.

6. The use of sialodochoplasty in the treatment of benign inflammatory obstructive submandibulargland disease. Rontal M, Rontal E. Laryngoscope. 1987 Dec;97(12):1417-21.

7. Rigid swelling of sublingual caruncle area due to the salivary gland duct obstruction by a sialolith. Bernardes Filho F, Martins G, Alves AO, Costa JR, Azulay DR, Azulay-Abulafia L. An Bras Dermatol. 2014 Nov-Dec;89(6):977-9

8. Lithotripsy of salivary calculi. Iro H. HNO. 1999 May;47(5):508-9

9. Transoral carbon dioxide laser sialolithectomy with topical anaesthesia. A simple, effective, and minimally invasive method. Yang SW, Chen TA. Int J Oral Maxillofac Surg. 2011 Feb;40(2):169-72.

10. Sialolithectomy done with a CO2 laser: clinical and scintigraphic results.
Azaz B, Regev E, Casap N, Chicin R.J Oral Maxillofac Surg. 1996 Jun;54(6):685-8